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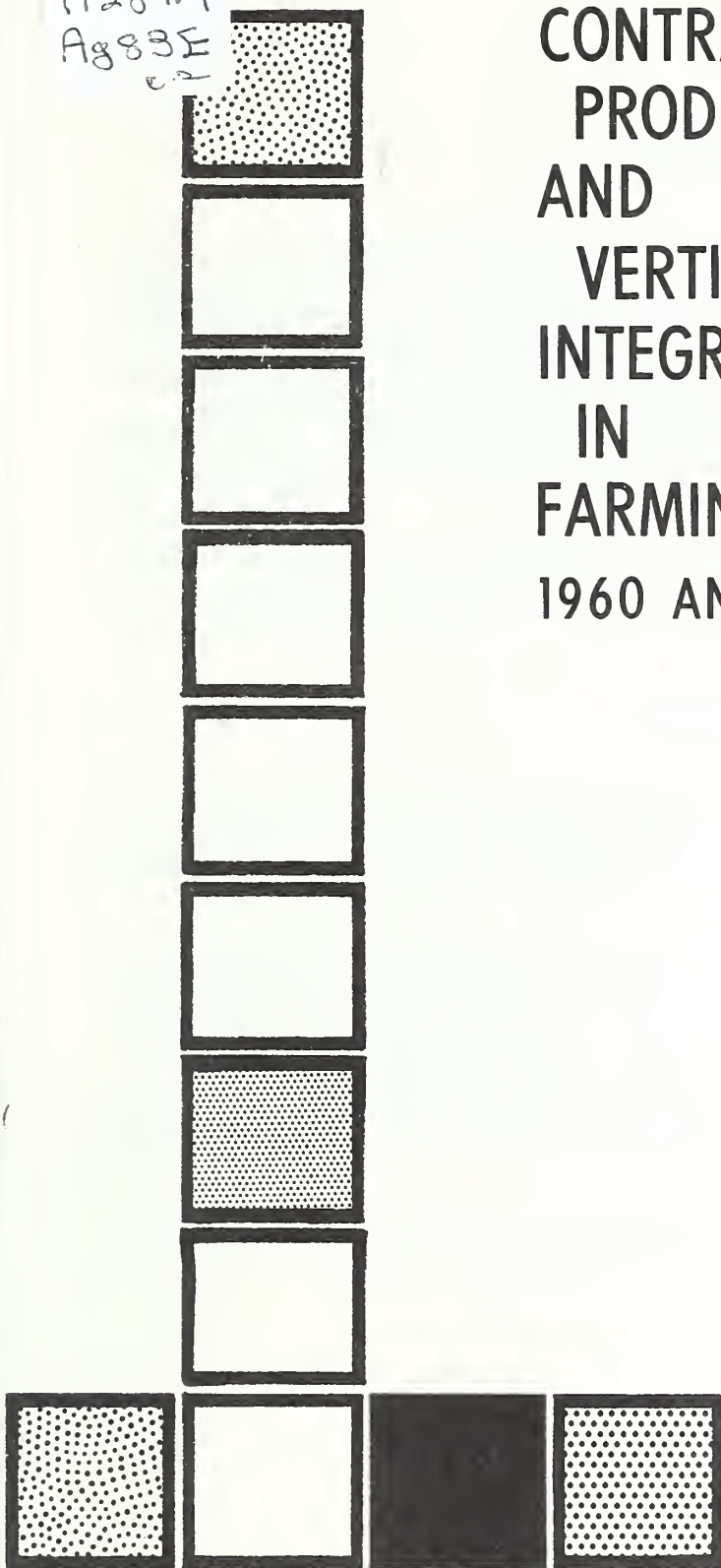
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# CONTRACT PRODUCTION AND VERTICAL INTEGRATION IN FARMING 1960 AND 1970



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## ABSTRACT

Aggregate changes in forms of vertical coordination in agriculture proceed slowly even when striking changes occur in individual farm commodities. Judgment estimates of the proportion of total farm production under some form of either contracting or vertical integration show an increase from about 19 to 22 percent of all farm output from 1960 to 1970, a shift of 3 percentage points. More increase in these forms of coordination took place in livestock than in crop products, especially in fed cattle, eggs, and turkeys.

Keywords: Vertical coordination, contract production, vertical integration, production contracts, forward contracts.

## PREFACE

Many are concerned about the structural changes going on in agriculture. Some of these seem to be proceeding very rapidly. But we may misjudge the magnitude of total change if we are guided mainly by spectacular instances that attract attention.

We also may fail to distinguish between different kinds of structural change. For example, contract production and vertical integration are alike in being forms of close vertical coordination. But they are quite unlike with respect to their effects on farm firms. Vertical integration may eliminate farms, but contract production may provide new opportunities. Production contracts, like farm leases, may be abused, but properly handled they offer advantages.

This report provides information about changes in contract production and vertical integration from 1960 to 1970.

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## SUMMARY

The proportion of total farm production under various forms of contracting and vertical integration increased from about 19 percent in 1960 to 22 percent in 1970, a shift of 3 percentage points. Contract production increased from 15 to 17 percent and vertical integration from about 4 to 5 percent. Both contracting and vertical integration increased relatively more in livestock products--especially fed cattle, eggs, and turkeys--than in crops.

Changes were limited because many major commodities were not much affected and because increases in some commodities were partly offset by decreases in others. For example, substantial increases in contracting in cotton and vegetables were counterbalanced by decreases in citrus and dry beans and peas.

There is little reason to expect a rapid rush into these forms of closer coordination. The total numbers reflect considerable stability. The analysis in this report suggests that aggregate changes in forms of vertical organization proceed slowly, even when noticeable changes occur in the production and marketing of individual commodities. Some contracting is likely to be temporary and will pass away as the special need for it declines. Some commodities may see more contracting or vertical integration as economic need develops, but growth is likely to be gradual.

# CONTRACT PRODUCTION AND VERTICAL INTEGRATION IN FARMING, 1960 AND 1970

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From time to time, observers express concern about the speed at which changes in the organizational structure of agriculture seem to be taking place. Contract production and vertical integration are often cited as examples of such changes. In 1963, a Department study reported some general estimates of the extent of various forms of vertical coordination in agriculture. <sup>1/</sup> Recently, a brief analysis of changes from 1960 to 1970 updated some of these estimates. This report indicates the results of this analysis.

The report focuses on the extent of contracting and of vertical integration in 1960 and 1970. The discussion is confined primarily to the question of changes between the two dates.

## Definitions

The terms "contract production," "vertical integration," and "vertical coordination" are often used loosely and interchangeably. It is not surprising that confusion results, and it is therefore desirable to define the way we use the terms.

To begin with, we use "vertical coordination" as the most general and comprehensive term. It includes all the ways of harmonizing the successive vertical steps, or stages, of production and marketing. Vertical coordination may be accomplished through the market price system, vertical integration, contracting, cooperation, or any other means, separately or in combination. There is always some kind of vertical coordination if any production takes place.

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<sup>1/</sup> R.L. Mighell and L.A. Jones. Vertical Coordination in Agriculture. U.S. Dept. Agr., Agr. Econ. Rpt. 19, 1963.

We take "vertical integration" to mean the kind of vertical coordination that goes on within one firm. The production stages that are coordinated are all inside that firm. Some of them may have formerly been in other firms but have been merged, so that they are no longer identified with separate firms.

"Contract production" in farming involves the vertical coordination of farm production under agreements between farmers and processors, dealers, or others who are usually at the first stage before or after the farm. Production contracts may be either written or oral. They are often called forward contracts because they are made in advance (before or forward) of the time of undertaking the production of a commodity or service. Agreement is reached before the farmer has committed much of his variable resources to the production of the specified commodity.

It is not always easy to draw a line between a contract that is a production contract and one that is only a marketing contract, because conditions vary so much between commodities and between areas. Consequently, measurement of the extent of contract production cannot be precise. Identification is easier with commodities which have distinct seasonal breaks or production cycles, so that production periods are clearly set apart. But with commodities in which production is continuous, it is more difficult. For example, fluid-grade milk is usually sold under a continuing contract between the producer and a cooperative or a proprietary handler. These arrangements are sometimes called marketing contracts, but in this analysis we define them as production contracts because they may influence subsequent production decisions.

As indicated above, "vertical integration" is used to designate the situation in which several successive stages of production are coordinated within one firm. Nearly all firms have some inherent vertical integration. Hence, one could say that practically all production is vertically integrated to some extent. However, what we mean here by vertical integration is the situation in which two or more stages that were formerly handled by separate firms are merged into one firm. And we mean, specifically, integration between farm and nonfarm stages. A livestock feeder who buys or builds a small packing plant to provide an outlet for his fed cattle is vertically integrating. So is a lettuce packer and shipper who goes into the business of growing lettuce. A broiler grower who builds his own feed mill is doing the same.

Farmer cooperatives are often mentioned in connection with vertical coordination of agriculture. Most farmer cooperatives are either supply cooperatives or marketing cooperatives. A cooperative is a form of corporation owned by farmers, collectively, and for this reason may bring about improved coordination. A farmer cooperative, for example, may help its members by developing more efficient ways of providing farm supplies and services, by operating processing plants, or by acting as a bargaining agency, or it may help its members make production or marketing contracts,

or perform other services.

Farmer cooperatives have been especially active in the supply field and in developing contractual relationships for farmers for a number of commodities. Citrus fruit and fluid milk are outstanding examples.

### About the Estimates

The estimates for contracting and vertical integration are based on the best judgments of a number of production and marketing specialists in the Department who are familiar with developments in each commodity. It is necessary to use judgment estimates because hard information is fragmentary. Precise data on the extent of various forms of coordination do not exist for many commodities. Efforts to obtain more data through the U.S. Census of Agriculture and special surveys have had limited success because of sampling and definitional problems. Information for successive time periods is frequently not complete enough for trend comparisons.

The estimates of production under each form of coordination are expressed as percentages of the total output of each commodity. Crop and livestock products are grouped separately.

The total percentages for all crops and all livestock were developed by weighting individual items by the weights used in computing the ERS index of total farm output. In combining crops and livestock to obtain a total for all farm output, an adjustment was made for the double counting involved in the farm-produced feed crops consumed by livestock.

### The Changes

The indicated changes in production contracting and vertical integration from 1960 to 1970 were not large (table 1). The percentage of total farm production under these forms of coordination rose from 19 to 22 percent. Contract production accounted for about 2 percentage points and vertical integration for about 1 percentage point.

The reasons for these relatively small shifts are suggested by an examination of the situation for individual farm commodities (tables 2 and 3). Most of the commodities with important elements of contracting or vertical integration have had these forms of coordination for a long time, so there is less room for a sudden upward change.

Another factor is that a number of the major staple crops have well functioning open markets and established technologies of production so that any other system of vertical coordination is less attractive. All of this means that the commodities in which

Table 1.--Estimated percentage of total farm output produced under production contracts, vertical integration, and both combined, 1960 and 1970

Kind of coordination	Percent	
	1960	1970
Production contracts.....	15.1	17.2
Vertical integration.....	3.9	4.8
Both.....	19.0	22.0

<sup>1/</sup> See tables 2 and 3 for individual crop and livestock items. Totals for production contracts and vertical integration in this table were obtained by combining the total estimates for crops and livestock after adjusting for double counting of farm-produced feed crops consumed by livestock. As in the ERS index of total farm output, crops represent about two-thirds of the final weight and livestock one-third.

Table 2.--Crops: Estimated percentage of output produced under production contracts and under vertical integration, United States, 1960 and 1970

Crop	Production contracts		Vertical integration	
	1960	1970	1960	1970
	Percent			
Feed grains.....	0.1	0.1	0.4	0.5
Hay and forage.....	.3	.3	---	---
Food grains.....	1.0	2.0	.3	.5
Vegetables for fresh market.....	20.0	21.0	25.0	30.0
Vegetables for processing.....	67.0	85.0	8.0	10.0
Dry beans and peas.....	35.0	1.0	1.0	1.0
Potatoes.....	40.0	45.0	30.0	25.0
Citrus fruits.....	60.0	55.0	20.0	30.0
Other fruits and nuts.....	20.0	20.0	15.0	20.0
Sugarbeets.....	98.0	98.0	2.0	2.0
Sugarcane.....	40.0	40.0	60.0	60.0
Other sugar crops.....	5.0	5.0	2.0	2.0
Cotton.....	5.0	11.0	3.0	1.0
Tobacco.....	2.0	2.0	2.0	2.0
Oil bearing crops.....	1.0	1.0	.4	.5
Seed crops.....	80.0	80.0	.3	.5
Miscellaneous crops.....	5.0	5.0	1.0	1.0
Total crops <sup>1/</sup> .....	8.6	9.5	4.3	4.8

<sup>1/</sup> The estimates for individual items are based on the informed judgments of a number of production and marketing specialists in the U.S. Department of Agriculture. The totals were obtained by weighting the individual items by the relative weights used in computing the ERS index of total farm output.

Table 3.--Livestock and livestock products: Estimated percentage of output produced under production contracts, and under vertical integration, United States, 1960 and 1970

Crop	Production contracts		Vertical integration	
	1960	1970	1960	1970
	<u>Percent</u>			
Fed cattle.....	10.0	18.0	3.0	4.0
Sheep and lambs.....	2.0	7.0	2.0	3.0
Hogs.....	.7	1.0	.7	1.0
Fluid-grade milk.....	95.0	95.0	3.0	3.0
Manufacturing-grade milk.....	25.0	25.0	2.0	1.0
Eggs.....	5.0	20.0	10.0	20.0
Broilers.....	93.0	90.0	5.0	7.0
Turkeys.....	30.0	42.0	4.0	12.0
Miscellaneous.....	3.0	3.0	1.0	1.0
Total livestock items <u>1/</u> .....	27.2	31.4	3.2	4.8

1/ See footnote 1, table 2.

significant changes are occurring in any one decade are not likely to be a large enough part of the total to cause a great change. Increases in these forms of coordination in some commodities may also be offset by decreases in others. For example, contracting of dry beans and peas seems to have decreased markedly in recent years.

### Crops

Farm products can be divided into crops and livestock. Crops are more numerous and cover a greater range of situations and therefore of variations in coordination, than livestock and poultry. More of the livestock items tend to be perishable and subject to quality variations, which may require closer coordination.

### Grains

There is little contract production of either food or feed grains except for small acreages of special types. Some of the breakfast food firms contract for certain qualities of grain for cereals. Special strains of grain, high-lysine corn, and malting barley, for example, may use contractual arrangements. Similarly, for grain crops there is little vertical integration, except of the fortuitous kind that comes about because the same man owns an elevator and a farm.

### Hay and Forage

Contracts in hay and forage are largely limited to arrangements with alfalfa dehydrators, and contracts for hay or silage between large feedlot operators and nearby farmers. These are important locally but the total number is not large.

Technically, a large amount of vertical integration exists on farms which raise their own feed crops to feed livestock. This is not usually considered to be integration, however, because we are so accustomed to it and it does not involve a merger of farm and nonfarm interests.

### Vegetables

Both contracting and vertical integration in vegetable production have increased in recent years, although the level has always been substantial. Nearly all the vegetables for processing are either contracted or integrated, mainly contracted. About half of the vegetables for fresh market are so produced, with vertical integration more important than contracting.

Most of the vegetables for processing need close coordination to protect both grower and processor. The grower needs an assured outlet for a perishable crop and the processor needs an assured supply to keep his expensive investment in fixed plant operating

as efficiently as possible. In addition, there are often quality factors that call for close technical coordination with respect to timing and speed of harvesting.

### Dry Beans and Peas

Much contracting took place in dry beans and peas at one time, especially when the crops were newly introduced in an area. As they became established crops, production contracts became rather nominal arrangements. Few of them provided supplies or financing. Most of them contained quality provisions and called for improved practices, but as growers learned the culture, these features were no longer essential. By 1970, contracts were no longer very common. If a shortage situation should arise, contracting might be revived.

### Potatoes

The percentage of potatoes under production contracts increased and the percentage vertically integrated decreased slightly in the 1960's. Because about 90 percent of processing potatoes are forward contracted, the increase in the proportion of the total crop processed (chips and flakes, frozen fries, etc.) has worked toward a rise in the proportion under production contracts. At the same time, more of the potato crop for fresh market has been integrated through the growing and shipping stages, although not enough to prevent some decrease in vertical integration for the total crop.

### Fruits

Much of the citrus crop, especially in California and Arizona, is produced by growers who are members of marketing cooperatives. This arrangement amounts to production under a continuing forward contract. In Florida, cooperatives probably handled half of the fresh citrus in 1960 and somewhat less of the processed. Recent data indicate some decline in cooperative activity in citrus, chiefly in the processing and marketing of frozen citrus concentrates. The reason is that some increase in vertical integration appears to have taken place through conglomerates or subsidiaries of conglomerates.

Some increases in vertical integration of other fruits have taken place in recent years as smaller producers have dropped out and more of the production has become concentrated in larger operations.

### Sugar Crops

Nearly all the sugarbeets produced in the United States are grown under contracts between growers and processors. This situation has existed from the beginning of the sugarbeet industry and is related to the high investment in processing equipment and the lack of secondary uses for beets. The only exceptions are small

quantities produced on experimental fields by researchers and processors testing for better varieties or trying out different cultural practices.

Sugarcane is grown under four different arrangements. First, some is grown by the concerns that operate the raw sugar mills. Second, some in Louisiana, Florida, and Puerto Rico is processed by cooperative mills which have contracts with member growers. Third, a number of independent growers in all these areas have what amounts to oral production contracts. There have been no significant changes in the general structure of these arrangements for 30 years or more. Finally, sugarcane in Hawaii is almost completely integrated under an intricate system of plantation farming and milling, with cooperative refining and marketing, including unionized labor.

### Cotton

Contract production of cotton has usually been relatively minor except for some financing arrangements between farms and gins or warehouses which may be equivalent to forward contracting. But in 1970, declining crop prospects and strengthening demand brought on a tight supply situation and a sharp rise in contracting, especially in the South Central Region. Field personnel of the Cotton Division, Agricultural Marketing Service, estimated that farmers contracted about 11 percent of the 1970 U.S. cotton crop for delivery at harvest. "This cotton was sold by farmers in some instances before the seed was in the ground and in other cases after stands were considered to be satisfactory." <sup>2/</sup> Even more of the 1971 crop was contracted and in early February 1972, it was thought that as much as a third of the 1972 acreage was already contracted. The contracts are between farmers on the one hand and merchants and shippers or ginners on the other. Some are directly with mills. The terms vary considerably but most contain price and grade specifications, and delivery dates.

Cotton contracting may fall off when U.S. cotton supplies became more plentiful. The contracts apparently were initiated because of the short supply situation to help meet mill commitments well in advance of needs. How much they may have influenced farmers' production decisions is uncertain.

### Tobacco

About the only tobacco now contracted is shade tobacco in Connecticut and Georgia-Florida. Part of the shade tobacco is also vertically integrated with tobacco companies. The percentage of the total U.S. tobacco crop affected is negligible.

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<sup>2/</sup> Ben A. Franklin. Marketing the 1970 Upland Cotton Crop. U.S. Dept. Agr. CS-253, Cotton Situation, Oct. 1971, pp. 12-14.

## Oil-Bearing Crops

There is virtually no contracting for soybeans, the principal oil-bearing crop, except for some specific varieties wanted for special purposes in small quantities. Some of the minor oil crops, for example, sunflower, safflower, and castor beans, are almost wholly contracted because of the limited market outlets.

## Seed Crops

Most seed crops are unique and are needed in definite but limited quantities. This is especially true for vegetable and flower seeds and hybrid seed corn.

Most vegetable seeds are raised by seed companies themselves or under very closely controlled contracts. Hybrid seed corn is grown in much the same way. Foundation stock is usually produced on the company farms and expansion of seed stocks is usually under closely supervised contracts with farmer-growers.

## Miscellaneous

A long list of specialty crops are grown under special production contracts. Popcorn, mustard seed, broomcorn, hops, peppermint, and spearmint are a few examples.

## Livestock and Poultry

### Fed Cattle

Changes in recent years in the fed cattle industry have centered around the rapid increase in large commercial feedlots and the associated expansion in custom feeding. Custom feeding is a type of contract production which may be regarded as a service performed for ranchers, dealers, packers, independent operators, or others who find this an efficient way of finishing cattle for market.

The estimated percentage of custom feeding nearly doubled from 1960 to 1970, while the small percentage of feeding by packers decreased slightly. <sup>3/</sup> The Packers and Stockyards Administration estimates indicate packer feeding of 6.3 percent of the total fed marketings in 1960 and 5.6 percent in 1970. However, these estimates do not separate direct packer feeding from custom feeding.

Although not covered by our definitions of contract farming or vertical integration, another related development should be mentioned. This is the recent growth of such devices as limited

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<sup>3/</sup> Packers and Stockyards Administration. Packers and Stockyards Resume, Vol. IX, No. 13, Nov. 1971.

partnerships and the public sale of corporation stock in feedlot corporations. These have become significant ways of bringing non-farm capital into cattle feeding. <sup>4/</sup> For some nonfarm investors who wish to participate in cattle feeding ventures, these may be more attractive alternatives than custom feeding contracts.

### Sheep and Lambs

Fed sheep and lambs have also been affected by some of the same kinds of changes as fed cattle. Custom feeding has increased as a percentage of total feeding and vertical integration has also risen although it remains at a low level. One important difference is that total numbers of sheep and lambs available for feeding have continued their long-term decline. This is in sharp contrast with the expansion in the cattle industry.

### Hogs

Interest in contract production of hogs continues with occasional flurries of special enthusiasm and activity, but contract production remains a small part of total hog output. The contractor is sometimes a feed dealer who supplies feed, pigs, and general management advice and may help market the hogs. Packers have been interested in stimulating several types of contracts, one being a sow-and-pig contract arrangement to help farmers shift to better quality strains of meat-type hogs.

### Dairy Products

Most of the fluid milk part of the dairy industry has long been pretty well organized under contract arrangements, either through cooperatives or directly with independent milk processors. These are essentially forward production contracts because they are made in advance of production commitments and involve various considerations that affect production decisions.

Although changes are continually being made in the terms of these arrangements, no appreciable change occurred in their extent between 1960 and 1970.

### Poultry and Eggs

Broiler production has been the most dramatic example of expansion in the area of contract production in the last generation. It is a remarkable story involving the favorable conjuncture of technological development in breeding, feeding, disease control, and economic ingenuity. But most of this was completed by 1960, so the developments of the last decade represent qualitative

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<sup>4/</sup> William H. Scofield. Nonfarm Equity Capital in Agriculture. Unpublished paper, March 1972, U.S. Dept. Agr.

changes rather than quantitative. Between 95 and 100 percent of the broiler output has been either contracted or vertically integrated since 1960. During recent years, there has been a small shift from contract production to vertical integration in broilers.

Egg production and turkey production have seen increases in both contracting and vertical integration since 1960, although they are not yet as closely coordinated in total as broilers.

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